Waterboro Quadrangle, Maine

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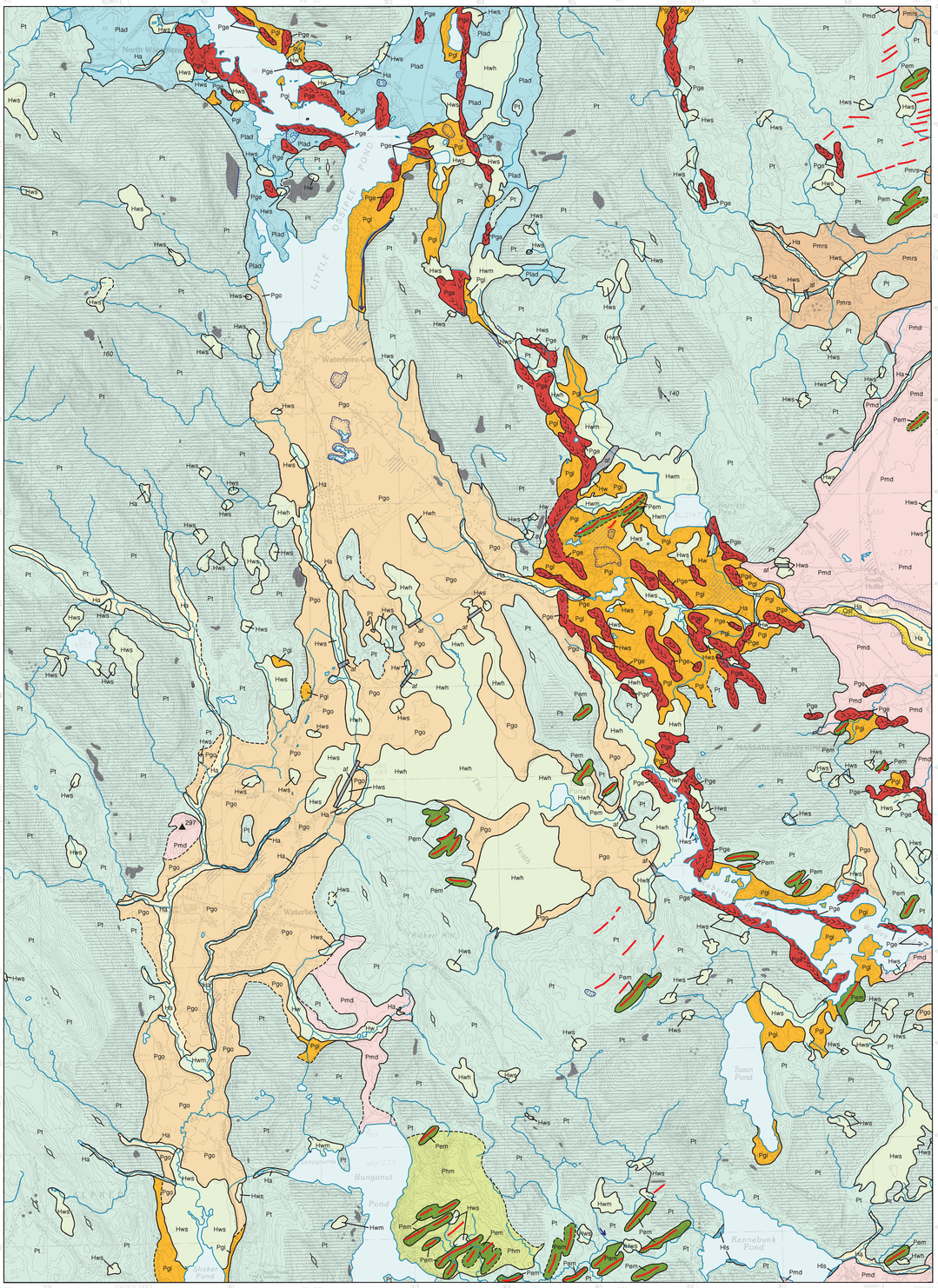
For additional information,
see Open-File Report 99-134.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Andres Meglioli completed during the 1990 field season; funding for this work provided by the U. S. Geological Survey COGEOMAP program. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

Quadrangle Location

SCALE 1 : 24,000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Waterboro quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

HOLOCENE DEPOSITS

af **Artificial fill -** Mainly composed of coarse gravel and sand, or various man-made materials.

Hls **Lake shoreline -** Holocene shoreline of ponds and lakes. Deposits are comprised of fine to medium sand and subordinate pebbles. Mapped around Kennebunk Pond.

Ha **Alluvium -** Generally well-sorted and stratified silt, sand, and gravel, deposited by modern streams. Associated with several brooks in the quadrangle.

Qst **Postglacial stream terrace -** Largely composed of fine gravel and sand, on erosional surfaces with flat topography. A late Pleistocene or Holocene terrace is found along Cooks Brook, south of South Hollis.

Hws **Wetland, swamp -** Wetland area, usually with abundant tree cover, but locally with open spaces. Fine-grained sediments (silt and clay) usually the underlying material. Little or no peat present. A well developed swamp is found on the north side of Shaker Pond, south of Waterboro.

Hwm **Wetland, marsh -** Grasses and sedges are the dominant vegetation found here. A complete transition exists in the study area between the different types of wetlands. Like other wetlands, marshes develop on flat, poorly drained areas.

Hwh **Wetland, heath -** Mosses, grasses and sedges are the dominant vegetation found here. Peat thickness varies considerably. Standing water is common.

Hw **Wetland, undifferentiated -** Undifferentiated wetland, underlain by peat, muck, silt, or clay.

PLEISTOCENE DEPOSITS

Plad **Lacustrine delta -** Chiefly composed of sand and fine gravel deposits with flat upper surfaces. The Lake Arrowhead glaciolacustrine delta deposits are found around Little Ossipee Pond.

Pmrs **Marine regressive sand deposits -** Sand, silt, and minor clay deposited in the sea adjacent to glaciomarine delta deposits in the eastern part of the quadrangle.

Pmd **Glaciomarine delta -** Deposits with flat upper surfaces and largely composed of sand and gravel. The South Hollis delta (located on the east boundary of the quadrangle) is the best developed of these deposits.

Pge **Esker -** Generally discontinuous ridges, often sinuous, composed largely of stratified and interbedded sand and gravel, with pockets of well-rounded boulders and cobbles. These glaciofluvial deposits were formed in subglacial meltwater conduits during glacier retreat.

Pgi **Ice-contact deposits -** Massive to variably interbedded sand and gravel deposited against or very close to the glacier, commonly with collapse features and irregular topography. In the Waterboro area, unit Pgi is usually associated with eskers.

Pgo **Outwash -** Gravel and coarse sand deposits with a flat topographic surface (outwash plain). The outwash plain south of Little Ossipee Pond has been modified by postglacial stream erosion.

Pem **End moraine -** Moraine ridge composed of till (silty-sandy diamicton) deposited at the margin of the last retreating glacier. Indicates the position of the ice margin during deposition. Several short ridges were found in the Waterboro quadrangle.

Phm **Hummocky moraine -** Till deposits characterized by hummocky and very irregular topography, often with big angular boulders and numerous depressions. Till thickness varies greatly.

Pt **Till -** Massive, poorly sorted diamicton with varying degrees of compaction. Deposited directly from glacial ice. Grain size ranges from clay to boulders. The unit is widely distributed throughout the quadrangle with thicknesses of 10 to 30 feet.

Bedrock - Gray areas indicate barren ledge. Horizontal ruled pattern indicates areas where surficial sediments are generally less than 10 feet thick. Gray dots show location of small outcrops, although some are exaggerated in size. Many bedrock exposures were too small to map precisely.

Area where the original topography has been modified or obliterated by excavation. Includes some gravel pits.

Contact - Indicates boundary between adjacent map units. Dashed where location is uncertain.

Glacially streamlined hill - Symbol indicates hills and bedrock knobs that have been elongated parallel to the flow of glacial ice.

135 **Glacial striation locality -** Dot marks points of observation; arrow shows ice movement direction inferred from striations on bedrock surface, with azimuth in degrees.

Terrace scarp - Adjacent to glacial meltwater channels and postglacial stream terraces.

Esker ridge - Shows trend of sand and gravel ridge deposited in a meltwater channel within or beneath glacial ice. Chevrons point in the direction of former meltwater flow.

Kettle - Depression created by melting of buried glacial ice and collapse of overlying sediments.

Meltwater channel - Channel eroded by a glacial meltwater stream. Arrow shows known or inferred direction of flow.

▲350 **Glaciomarine delta -** Number indicates surveyed elevation in feet of the contact between topset and foreset beds, which marks the position of the corresponding sea level at the time of deposition.

End moraine ridge - Line indicates axis of till ridge deposited in the marginal zone of the receding ice sheet.

Boulder fields - Areas of numerous large boulders.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Meglioli, A., 1999, Surficial geology of the Waterboro 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 99-134, 7 p.
2. Meglioli, A., 1998, Surficial materials of the Waterboro quadrangle, Maine: Maine Geological Survey, Open-File Map 98-178.
3. Neil, C. D., 1998, Significant sand and gravel aquifers of the Waterboro quadrangle, Maine: Maine Geological Survey, Open-File Map 98-144.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.